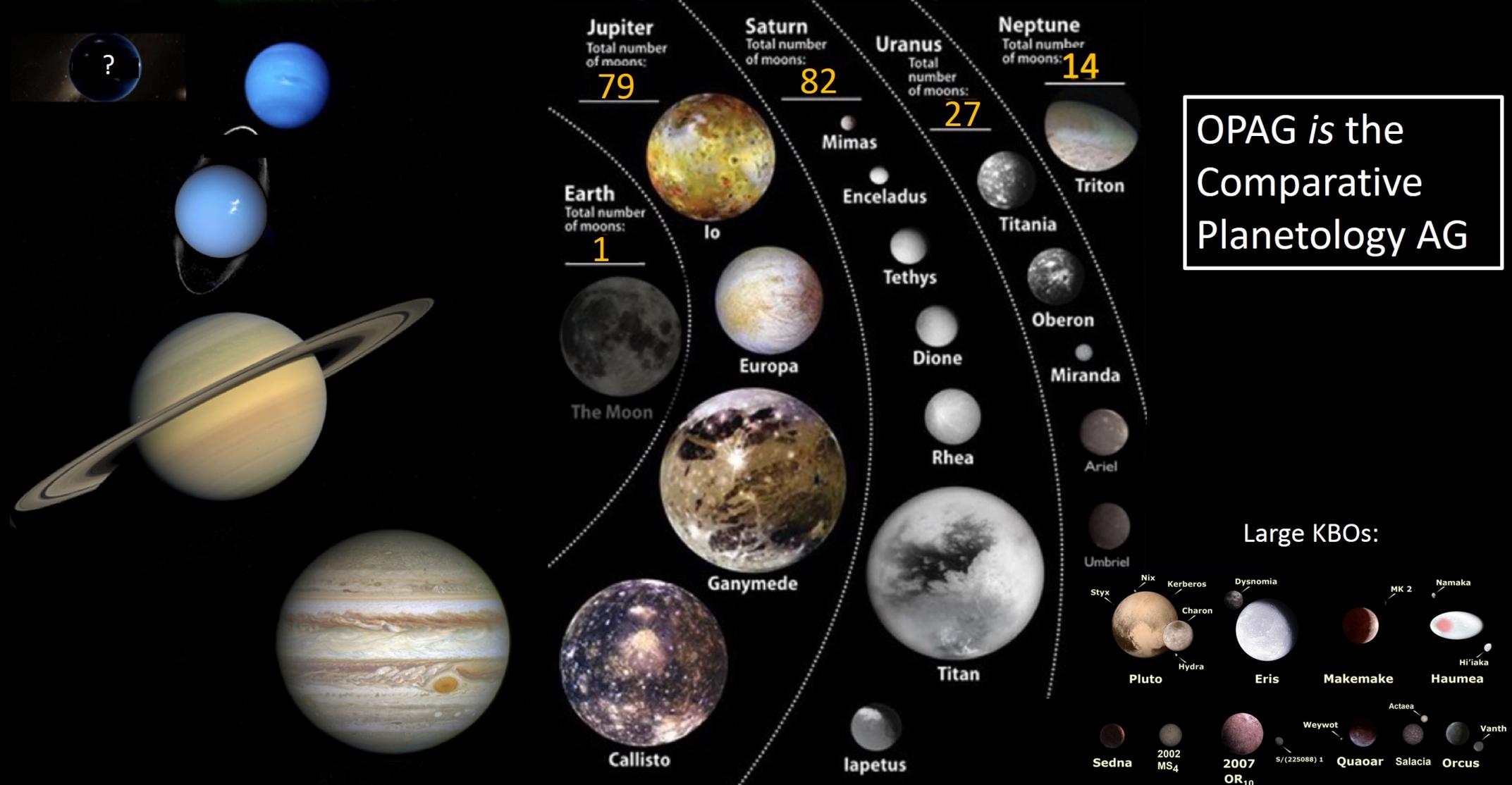


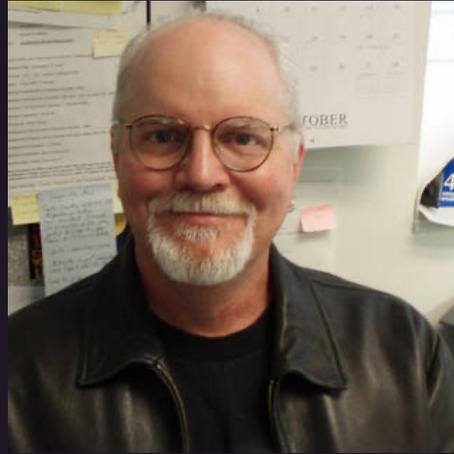
OPAG Update to the Planetary Science Advisory Committee (PAC)

Linda Spilker (JPL), Jeff Moore (NASA ARC), OPAG Co-Chairs, PAC Meeting, 16 November 2021

Outer Solar System: Many Worlds to Explore



OPAG Steering Committee



Jeff Moore
OPAG Co-Chair
Ames Research Center



Linda Spilker
OPAG Co-Chair
Jet Propulsion Lab



Kennda Lynch
Lunar and Planetary Institute



Kathleen L. Craft
Applied Physics Laboratory

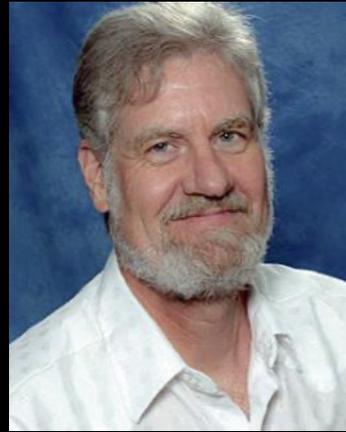


Krista Soderlund
Institute for Geophysics
University of Texas

OPAG Steering Committee



Morgan Cable
Jet Propulsion Lab



Alfred McEwen
University of Arizona



Kunio Sayanagi
Hampton University



Tom Spilker
Consultant



Abigail Rymer
Applied Physics Lab

OPAG Steering Committee



Scott Edgington
Jet Propulsion Lab



Amanda Hendrix
Planetary Science Institute



Lynnae Quick
NASA Goddard



Kathleen Mandt
Applied Physics Laboratory



Terry Hurford
Goddard Space Flight Center

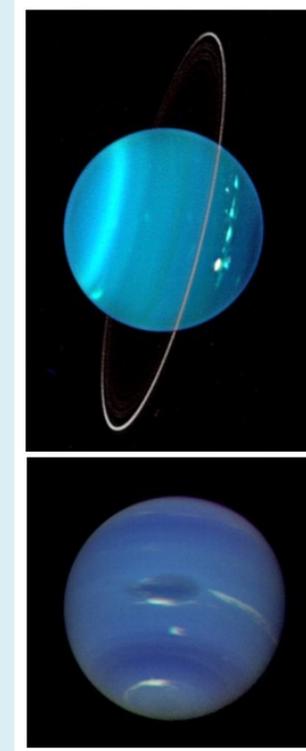


Carol Paty
University of Oregon

Outer Planets Assessment Group (OPAG) Charter

<https://www.lpi.usra.edu/opag/>

- NASA's community-based forum to provide science input for planning and prioritizing outer planet exploration activities for the next several decades
- Evaluates outer solar system exploration goals, objectives, investigations and required measurements on the basis of the widest possible community outreach
- Meets twice per year, spring and fall
 - Next meeting (hybrid): Spring 2022
- OPAG documents are inputs to the Decadal Surveys
- OPAG and Small Bodies Assessment Group (SBAG) have Joint custody of Pluto system and other planets among Kuiper Belt Objects



KBO planets

Recent and Upcoming OPAG-related Meetings

Recent Meetings

- **OPAG Meeting** (30 August – 1 September 2021) (Virtual)
 - Focused on Planetary Science and Astrobiology Decadal Survey
 - Developed Findings from recent meeting

Upcoming Meetings

- **Town Hall at AGU** (Friday, 17 December 2021 from 11:15 – 12:15 CST)
- **Town Hall at LPSC** (March 2022)
- **Spring OPAG Meeting Meeting** (19 – 21 April 2022) (Hybrid)
 - Focus on Planetary Science and Astrobiology Decadal Survey report

Request for PAC Advocacy:

1. Status of RPS Development and Production

- **Preamble:** Recent presentation by June Zakrajsek provided status of Radioisotope Power Systems (RPS) Program
- **Finding:** RPS units are essential for outer planet missions.
- OPAG requests NASA to commit to preparing and fueling RTG units for the next decade to meet the science needs of entire planetary exploration community.
- Announce how many RTG units of each type will be prepared as well as timeline for their development over at least the next decade.
- RPS production plan for the next decade: including one flagship mission (three NextGen units), two NF missions (up to two NextGen units each), and at least one Discovery mission.
- OPAG further urges NASA to commit to a timely development of the higher power Next Gen Mod 2 RTG in support of additional missions beyond the early 2030s.

Request for PAC Advocacy:

2. Cost Provisions and Radioisotope Power for Future Discovery and New Frontiers AOs

- **Preamble:** Two finalists for Discovery 2020 were Io Volcano Observer (IVO) and Trident. Dragonfly was selected for New Frontiers 4.
- Mission concepts were enabled by provisions to exclude launch vehicle and Phase E expenses (operations and science post-launch) from cost cap.
- Further enabled by making Radioisotope Power Systems available (needed by Trident and Dragonfly).
- **Finding:** OPAG urges NASA to continue to exclude launch vehicle and Phase E costs from the cost cap of Discovery and New Frontier missions.
- OPAG also urges NASA to continue to make radioisotope power available in future Discovery and New Frontiers AOs.

Request for PAC Advocacy:

3. Schedule for Future Discovery and New Frontiers AOs

- **Preamble:** NASA recently delayed the NF-5 AO by approximately two years such that the schedule currently lists Discovery in 2023 and NF-5 in 2024, less than one year apart. Concern that Discovery schedule may be adversely impacted.
- Delay of NF-5 is also inconsistent with the two missions per decade cadence recommended by V&V Decadal survey
- **Finding:** OPAG requests no further delays to either the currently planned NF-5 or Discovery AO releases and to provide the NF-5 draft AO as soon as possible.
- Make every effort is made to "catch up" for delays in the current decade in order to stay on schedule with V&V Decadal recommended cadence of two New Frontiers missions per decade.
- OPAG further requests that NASA communicate updates to the expected AO release dates for the next Discovery and New Frontiers calls to the community as soon as possible to facilitate planning and ensure time for teams to prepare quality proposals.

Backup: Full Text of Findings

Request for PAC Advocacy:

Status of RPS Development and Production

- **Preamble:** The current status of NASA's Radioisotope Power Systems (RPS) development for future missions to the outer solar system was presented by June Zakrajsek, manager of the RPS Program. Currently one NextGen RTG unit will be available for New Frontiers 5 or a Flagship mission to be launched in the 2030's. In addition, one additional NextGen RTG ("Mod1") unit will be fabricated by the 2030's but there is no commitment to fuel it. The RPS program's effort to develop a higher-power version of NextGen unit ("Mod2") continues; however, no clear timeline for its availability was presented. The OPAG community notes that one NextGen RTG unit currently assumed for the NF-5/Flagship in 2030 underestimates the power need of such a mission; in comparison, the Neptune Odyssey flagship mission concept study by Rymer et al. indicates that comprehensively meeting the science goals of a future Ice Giant mission would require a power level similar to that of the Cassini orbiter, which could be satisfied by a minimum set of three NextGen units.

Request for PAC Advocacy:

Status of RPS Development and Production

- **Finding:** RPS units are essential for outer planet missions. OPAG requests NASA to commit to preparing and fueling RTG units for the next Flagship so that those units are available for an early 2030s launch. In addition, OPAG requests NASA to prepare and fuel RTG units with adequate power for NF and Discovery missions of the next decade, and announce how many RTG units of each type will be prepared as well as the timeline for their development. For the next decade, the RPS production plan should consider the needs of missions including one flagship mission (three NextGen units), two New Frontiers missions (up to two NextGen units each), and at least one Discovery mission. We also request NASA to examine options to build additional RTG units to fulfill any unforeseen needs that may surface and to prepare for other missions of the next decade to meet the science needs of the entire planetary exploration community served by NASA. OPAG further urges NASA to commit to a timely development of the higher power Next Gen Mod 2 RTG in support of additional missions beyond the early 2030s.

Request for PAC Advocacy:

Cost Provisions and Radioisotope Power for Future Discovery and New Frontiers AOs

- **Preamble:** Two finalists for Discovery 2020 were the Io Volcano Observer (IVO) and Trident, and Dragonfly was selected for New Frontiers 4. These mission concepts were enabled by important provisions to exclude launch vehicle and Phase E expenses (operations and science post-launch) from the cost cap, and to make radioisotope power systems available (needed by Trident and Dragonfly).
- **Finding:** OPAG urges NASA to continue to exclude launch vehicle and Phase E costs from the cost cap of Discovery and New Frontier missions. OPAG also urges NASA to continue to make radioisotope power available in future Discovery and New Frontiers AOs.

Request for PAC Advocacy:

Schedule for Future Discovery and New Frontiers AOs

- **Preamble:** NASA recently delayed the New Frontiers 5 (NF-5) AO by approximately two years such that the schedule currently lists Discovery in 2023 and NF-5 in 2024, less than one year apart (<https://soma.larc.nasa.gov/index.html>), which raises concerns about whether the Discovery AO release schedule may be adversely impacted. Proposal teams invest significant effort at least a year before AO release, and often several years in advance, so knowing the timeline of the AO release and the launch readiness date with certainty is critical. Therefore, OPAG is highly concerned with the delay of NF-5 and the cascading effect of this delay that places Discovery AO in 2023, Q2, and New Frontiers 5 in 2024, Q1. The delay of NF-5 is also inconsistent with the two missions per decade cadence recommended for the New Frontiers program by the Visions and Voyages decadal survey.

Request for PAC Advocacy:

Schedule for Future Discovery and New Frontiers AOs

- **Finding:** The New Frontiers program is essential to outer solar system exploration. OPAG requests no further delays to either the currently planned NF-5 or Discovery AO releases, and to provide the NF-5 draft AO as soon as possible. OPAG requests that the slip of NF-5 not impact future missions, and that every effort is made to "catch up" for delays in the current decade in order to stay on schedule with the Visions and Voyages Decadal recommended cadence of two New Frontiers missions per decade. OPAG further requests that NASA communicate updates to the expected AO release dates for the next Discovery and New Frontiers calls to the community as soon as possible (ideally at least one year advance) to facilitate planning and ensure time for teams to prepare quality proposals.